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*THE PROGRESS AND ACHIEVEMENTS OF
HYGIENE.**

HYGIENE is a department of medicine whose object is the preservation and promotion of health and deals, therefore, with all the various factors likely to influence our physical welfare. It is not an independent science, but rather the application of the teachings of physiology, chemistry, physics, meteorology, pathology, statistics, epidemiology and bacteriology to the maintenance of the health and life of individuals and communities. The subject is very properly divided into personal and public hygiene. In the former the doctrines are applied to individuals, in the latter to communities.

This branch of medicine has received such an impetus within the last twenty-five years that many persons regard it of modern origin; such, however, is not the case, for on turning to early history we almost invariably find that the health of the population has been made a subject of legislation. Hygiene was practiced by the Egyptians, who paid special attention to their diet and the care of children; they knew the dangers of floods to health, and resorted to preventive measures against their occurrence, as well as against the spread of contagious diseases.

The old Indians paid special attention to diet, habitation, exercise and the isolation of children in case of infectious diseases. The Mosaic code of laws contains minute directions for the cleanliness of the person, the purification of the dwelling and camp, the selection of healthy and avoidance of unwholesome food, the seclusion of persons with contagious diseases, the regulation of sexual functions, etc. The sanitary code, especially that part which relates to the slaughtering of animals, the food supply, its preparation, care of utensils for cook-

ing, eating and drinking, personal cleanliness and frequent ablutions of the hands, appear peculiarly appropriate, since our knowledge of infectious disease germs, and it is a singular fact that, from some cause or causes, this race presents an endurance against disease that does not belong to other portions of the civilized communities amongst which its members dwell.

This resistance dates from the first to the last periods of life. Hoffmann finds that in Germany the number of still-born amongst the Jews was 1 in 39, and of the other races 1 in 40. Mayer determined that Hebrew children from one to five years of age die in the proportion of .10% as against 14% among the Christian children. After the fifth year the value of life still continues in favor of the Jews; the average duration of the life of the Jew being 48 years and 9 months, and of the Christian scarcely 40 years. In the census statistics of 1890, Dr. Billings has investigated the subject and developed the fact that the death-rate among the Jews in our own country is very low, being only 7.11 per 1,000, a little more than one-half the annual death-rate among other persons of the same social class and conditions of life, but the facts of most interest brought out are the low marriage rate, 7.4 per 1,000, as compared with 18 to 22 per 1,000 among the general population, and the low birth-rate, which was 4.66 for each mother. The number of Jewish children under 5 years of age in this country is therefore less, being in the proportion of 9 to 13, of the average population, but from 5 to 15 years it is greater in the proportion of 29 to 23. The causes for the higher vitality of the Jewish race have been earnestly searched for, because that race which presents the strongest vitality, the greatest increase of life and the longest resistance to death must in course of time become dominant. The causes may be summed up in the term

* Read before the Anthropological Society, Washington, D. C., May 4, 1897.

'soberness of life.' The Jew drinks less than his Christian brother; he takes as a rule better food; he takes better care of his poor and he takes better care of himself. How much his sanitary code of laws has accomplished in this direction I will not undertake to estimate.

A study of the habits of the primitive peoples in different parts of the globe shows that a desire to prevent disease is innate to all men. Among matters of personal hygiene may be mentioned massage for the purpose of overcoming fatigue, ocean, river, hot-air and vapor baths as practiced among many Indian tribes, the employment of eye-protectors against the glaring effects of snow among the inhabitants of the Arctic region, the use of respirators by the Kwixpagmut, an Eskimo tribe, to prevent the inhalation of smoke during their sweat baths. (Max Bartels, p. 222).

Many of our North American Indians have their medicine dances, the chief object of which appears to be the preservation of health. Thus the men of the Nez Percés tribe, between the ages of 18 and 40, assemble annually for the purpose of conquering 'Mawisch,' the spirit of fatigue; the ceremony lasts from three to seven days, and consists in the introduction of willow bougies into the stomach, followed by hot and cold baths and abstinence from food. The Indians are of the firm belief that they secure thereby increased strength and power of endurance (Bancroft), and I see no reason why a perfect cleansing of the body and temporary fasting should not result in a thorough purification of the blood and tissues, a more perfect metabolism and increased nutrition and power of resistance of the individual cells.

The disposal of the dead by cremation, and the destruction of the tepee and personal effects by fire after fatal cases, is a practice in vogue among a number of Indian tribes, and are worthy of mention, as

fire is the best known germicide. Many of these primitive peoples appear to have correct ideas as to the communicability of certain diseases. Ehrenreich tells us that consumption prevails extensively among the Karayá in Brazil, and whenever a stranger approaches their huts he is asked whether he suffers from a cough, and unless the answer is negative he is not admitted—a very suggestive precept in view of the fact that scientific medicine has established the infectious character of tuberculosis. Pallas writes that the Kirgise during small-pox epidemics do not hesitate to use their arrows if necessary to keep infected subjects from entering their homes. In passing I may remark that such a brutal system of quarantine was practiced only last year in our country. A man suffering from small-pox was expelled from Arkansas and refused admittance into Mississippi. As he could not remain in or on the Mississippi River until the disease ran its course, he attempted to evade the quarantine and land on the river bank in the latter State, but was shot and killed by one of the quarantine officers.

As an example of public health measures may be mentioned the fact that Harmond, during an expedition to Mé Không, in Farther India, in the land of the Khâs, found, suspended outside of all villages which had been previously visited by cholera, a piece of wood, carved with a sign language to the effect, "Whosoever dares to invade our palisade during the next twelve days will be imprisoned and must pay a fine of four buffaloes and twelve ticals;" the sign on the reverse side gave the number of men, women and children in the village. The same observer noticed that the inhabitants of villages occupied by the Attapeu, which are close neighbors of the tribe of Laotes, laid pieces of lumber in the form of a star across their roads and paths, or suspended similar signs with bunches of leaves with-

out the gates of their settlement, to warn strangers of the prevalence of an epidemic among men or beasts within. The natives of the island of Keisar interdict marriage with lepers, evidently believing that leprosy is not contagious but is transmitted by heredity, while the natives of the Watubela islands believe the converse and transport their lepers to Gorong for isolation and treatment.

The practice of isolating contagious disease, especially during epidemics, appears to be quite common. Thus, at the island of Nias small-pox patients are sent to a temporary shelter outside of the camp and placed in charge of a relative, protected by a previous attack. The Traos of Cochin China, the Tunguse and Burates abandon their small-pox patients after providing them with boiled rice and water. Some of the Indian tribes in northern Mexico also abandon their contagious cases after placing water and wild fruits within easy reach.

But, to return to the Aryan race, we find that the Greeks and Romans, although not, like the Jews, making hygiene a part of their religious duty, paid special attention to the physical culture of their youth, endeavoring, by a rational care of the body, to promote the culture of their mind, and to secure freshness and energy, courage, presence of mind, grace and dignity. "The laws of Lycurgus," says Dr. Gardner, "are not wanting in very pointed enactments on sanitary matters, and the importance attached by all the Greek republics and in the Platonic ideal polity to physical culture is too well known to require further comment;" they paid, also, much attention to the water-supply, constructed numerous aqueducts, and Athens was provided with sewers at an early period of its history.

The teachings of Hippocrates, 400 B. C., doubtless bore many fruits, and whether it is true or not, as stated by Galen, that he ordered, during a pestilence at Athens, aro-

matic fumigation and large fires in the streets, we have at least his writings on air, water, soil, habitations and occupations and his views of local and seasonal influences on sporadic and epidemic diseases. In Homer's *Odyssey* reference is made to Ulysses purifying his house with burning sulphur, and Aristotle in his *Politica* shows his sanitary acumen when he says: "The greatest influence upon health is exerted by those things which we most freely and frequently require for our existence, and this is especially true of water and air."

The Romans, amidst their military operations, found time to construct the 'Cloaca maxima' about 2,400 years ago, which not only served for the removal of refuse, but also helped to drain many of the marshes, and constitutes the principal sewer of modern Rome. Aqueducts were made to cover miles upon miles of the surrounding plains, and their splendid ruins, many of which have been restored and are now used for their original purpose, attest the munificence and abundance with which the first of sanitary requisites was supplied to the Eternal City. At one time Rome had 14 large and 20 small aqueducts, some of which carried the water from a distance of 50 kilometers, and during the reigns of Tiberius and Nero the per capita supply was over 1,400 liters a day. It is stated that between 400 B. C. and 180 A. D. about 800 public baths were established, among them the 'Thermae Caracallæ,' which alone could accommodate 3,000 bathers at one time. It has often been charged, how justly I cannot say, that one of the first things the Christians did in Rome was to try to tear down the baths and convert them into churches; but when we see in our own midst the attempt to convert these useful institutions into abodes of vice, we can imagine how, with a licentious people like the Romans, their baths had degenerated into hotbeds of iniquity.

During the reign of the Cæsars attempts were made to drain the Pontine Marshes, sanitary officials and physicians to the poor were appointed and homes for poor girls and orphans were established. In the meantime the true spirit of Christianity asserted itself, and we read of the establishment of hospitals as early as the 4th century; these were speedily followed by infant and orphan asylums and homes for the poor and incurables. During the Middle Ages sanitation received a decided check, ignorance and brutal prejudices appear to have been the ruling spirit, and for many reasons it was the most insanitary era in history.

About this time most of the towns in Europe were built in a compact form, surrounded with walls; the streets were narrow and often winding for defensive purposes, shutting out light and air from the houses. The accumulation of filth was simply frightful. Stables and houses were close neighbors, human filth was thrown on the streets or manure heap. A city ordinance of Muhlberg in 1367 prescribed that manure deposited by householders on the market space must not be allowed to remain longer than 14 days. The dead were buried within the churchyards. Sewers and aqueducts having been permitted to fall into disuse, the inhabitants were compelled to resort to wells with polluted subsoil water. All the conditions were favorable for the spread of infectious diseases, and in the 14th century the Oriental pest or bubonic plague carried off in Germany over a million victims. Venice lost 100,000 and Florence 50,000 of its inhabitants; England lost one-half of its people, and London, then a city of 110,000 residents, buried over 50,000 in one cemetery. According to conservative estimates the deaths from this plague in Europe amounted to from 25 to 30 million people. The majority of people regarded the plague

as the dispensation of God's providence, an evidence of divine wrath, which they hoped to allay by all sorts of self-inflicted punishments, and the passion plays of Oberammergau and elsewhere originated about this time. Others accused the Jews of being the cause, and hundreds were burned at the stake until Pope Urban IV. placed them under his special protection. The Faculty of Paris attributed the epidemic to the conjunction of planets on a certain day in 1345, and the Faculty of Leipzig, with equal gravity, asserted that it was connected with earthquakes, unseen waves of air, inundations, etc. Venice, alone of all Europe, took a sensible view of the matter, and for the first time in history, in 1348, appointed three guardians of public health, and the rules adopted later to isolate infected houses and districts for forty days has given rise to the term quarantine (from *quaranta giorni*).

We are told that this board rendered excellent service in matters relating to public sanitation, the control of markets and the sale of unwholesome foods, etc., and also inaugurated a system of mortality reports with columns for the insertion of the cause of death, showing that they fully appreciated the importance of vital statistics in the study of the causes and prevention of disease. This question is scarcely understood at the present day, and yet, as remarked by Dr. Billings, "when we wish to study the healthfulness of a city, whether it is getting better or worse, or judge correctly the effects of certain sanitary laws, we should not only know the number of deaths, but also the amount and character of the prevalent diseases, together with accurate information as to the number of population at different ages."

The repeated invasion of the Oriental pest appears to have everywhere compelled some sanitary efforts and an imperial decree in 1426 required the appointment of city

physicians throughout Germany, whose duty it was to adopt preventive measures.

A city ordinance of Nürnberg in 1562 gives detailed directions as to the quality of bread, beer and wine offered for sale, the cleaning of streets and houses, the disposition of infected clothing and bedding, the fumigation with sulphur and straw of pest-houses, etc.

In 1685 Prussia established a Central Medical Bureau, and appointments of health officers and privy medical counsellors were made, whose duties consisted in advising the men entrusted with the care of the government on matters relating to public health, and some of these titles are still in vogue in Europe. About the same time sanitary improvements in the way of widening streets for the purpose of supplying more air and light to the habitations, and better methods for the collection and removal of the wastes of human life were introduced, but, broadly speaking, at the close of the 17th century the habits of the people in Europe were generally filthy and in striking contrast to those observed among the most untutored savages of the present day.

In Madrid, we are told, that not even a privy existed in 1760. It was customary to throw the ordure out of the windows at night, and it was removed by scavengers the next day. An ordinance having been issued by the king that every householder should build a privy, the people violently opposed it as an arbitrary proceeding, and the physicians remonstrated against it, alleging that the filth absorbed the unwholesome particles of the air which otherwise would be taken into the human body. His majesty, however, with commendable zeal, persisted, but many of his citizens, in order to keep their food wholesome, erected privies close to their kitchen fireplaces.

With such unsanitary conditions we need be surprised that the mortality in

towns was greater than their birth-rate and that the city population had to be recruited continually from the country, conditions which existed until the beginning of the present century. Professor Finklenburg, of Bonn, estimates that the average human life in the 16th century was only 18 to 20 years, while to-day it is over 40 years.

The mortality of London between 1660 and 1679 was 50 per 1,000 of inhabitants; from 1679 to 1728, including the period of pests, it was 80 per 1,000; between 1728 and 1780 it was still 40 per 1,000, while at the present time it is between 20 and 21 per 1,000, and the mean annual death-rate in England is less than 19 per 1,000. Without underestimating the brilliant achievements of Jenner's discovery of vaccination in 1796, which as a preventive measure has saved millions of lives, no two factors have contributed so much to the general result than the improvement of the air we breathe and the water we drink. Indeed, we have ample evidence that, with the introduction of sewers and public water supplies, the general mortality in numerous cities, during the past forty years, has been reduced fully one-half, the good effects being especially shown by a marked decrease in the number of cases of typhoid fever, diarrhoeal diseases and consumption. The vital statistics of Great Britain furnish the proof. The mortality of Salisbury within the last 30 years has been reduced from 40 to 16 per 1,000; at Dover from 28 to 14 per 1,000; at Rugby from 24 to 10 per 1,000; at Croydon from 28 to 15 per 1,000 and at Matlock from 18 to 9 per 1,000.

		Enteric Fever.	Diarrhoea.	Consumption.
Bristol,	before sanitary works	10.0	10.5	31.0
"	after " "	6.5	9.1	25.5
Leicester,	before " "	14.7	16.0	43.3
"	after " "	7.7	19.3	29.3
Cardiff,	before " "	17.5	17.2	34.7
"	after " "	10.5	4.5	28.6
Mucclesfield,	before " "	14.2	11.0	51.5
"	after " "	8.5	9.0	35.3
Warwick,	before " "	19.0	5.7	40.0
"	after " "	9.0	8.0	32.3

Stratford,	before sanitary works	12.5	11.2	26.6
"	after " "	4.0	5.7	26.5
Ashby,	before " "	13.3	4.0	25.5
"	after " "	5.7	8.3	31.3
Dover,	before " "	14.0	9.5	26.5
"	after " "	9.0	7.0	21.2
Croydon,	before " "	15.0	10.0	—
"	after " "	5.5	7.0	—

Now let us see what a pure water supply has accomplished. A summary of the evidence on this subject reveals the significant fact that cities, both at home and abroad, in which there has been the most marked decrease in the typhoid-fever death-rate, are those in which a pure supply has been substituted for a pre-existing contaminated one. Thus, for example, the typhoid-fever death-rate in Boston in 1846-1849 was still 17.4 per 10,000; in 1890-1892 it had fallen to 3.2 per 10,000, the city having in the meantime expended \$25,000,000 on its water supply. The rate from this disease in Lawrence, Mass., for five years prior to 1893 was 12.7 per 10,000. After the establishment of sand filters, in September, 1893, the rate fell during the first twelve months to 5.2 per 10,000. In other words, 48 human lives at a value of \$5,000 each, or a total value of \$220,000, were saved to that city by an expenditure of only \$65,000 for the plant and \$4,000 running expenses per year. The typhoid-fever death-rate in Chicago in 1892 was 14.3 per 10,000. After improving the water supply it fell to 5.6 per 10,000. In 1874 the rate in Vienna was 11.5 per 10,000, and, with the introduction of a pure water supply, it has fallen to less than 2 per 10,000. The experience of London, Berlin, Munich and a host of other cities has been precisely the same.

Munich was notorious for its excessive typhoid-fever death-rate, it being 29 per 10,000 in 1856. With the introduction of a pure water supply and improved sewer system it has fallen to less than 2 per 10,000.

The question has passed beyond the speculative or experimental stage. Conserva-

tive cities are not in the habit of authorizing the expenditure of large sums of money without counting the cost and results; and the mortality statistics have furnished more eloquent and conclusive arguments than the most zealous advocates of sanitary reforms.

An abundance of water does not limit the spread of typhoid fever, for New York City, with only 78 gallons per head a day, has only 2.3 deaths; while this city, with a daily per capita consumption of 173 gallons, furnishes 8.12 deaths, and stands today No. 7 on the list of 54 American cities as regards an excessive death-rate from typhoid fever, only Denver, Allegheny, Camden, Pittsburg, Newark and Charleston furnish a higher rate.

Let us advocate, therefore, an ample quantity of pure water, and until this is accomplished let us filter and boil our drinking water, boil our milk, and thoroughly disinfect the excreta of typhoid-fever patients. The present century can boast therefore, of many advances in hygiene, particularly since the European invasion of cholera in 1830. The English towns and cities which had been visited by this disease and those fearing similar scourges were perfectly willing to profit by the investigations of the causes of infectious diseases and freely instituted sanitary reforms in the establishment of sewers, public water supplies, sanitary homes, etc. The example of England was followed by all civilized nations, with similar results. The effects of sanitation, as taught by Dr. Parkes, were demonstrated during the Crimean War and, as beautifully expressed by Virchow during our Civil War, reached 'the highest point in humane efforts ever attained in a great war.'

A study of the causes of infectious diseases also suggested more enlightened means for their prevention or mitigation, as the compulsory vaccination against small-pox, compulsory isolation and disin-

fection in a number of infectious diseases, the prevention of soil and water pollution for the restriction of typhoid fever, cholera, dysentery and other water-borne diseases, and, finally, the labors of Pasteur, Koch, and Sternberg of our country, in the identification and destruction of disease germs, have accomplished a great deal and opened a field of preventive inoculations which promises other practical results. The medical profession speaks of preventable diseases, and the Prince of Wales, in his opening address at the International Congress of Hygiene, held in London in 1891, very properly said: "If certain diseases are preventable, why are they not prevented?" The facts are that whilst the scientific physician knows fully well that if, for example, the dejecta of every typhoid-fever patient were promptly disinfected with germicides, typhoid fever would be stamped out in the course of a few years, he is not in a position to enforce this opinion by effective laws.

To illustrate what germicides and antiseptic methods have accomplished, let me remind you that the mortality from all amputations in the Crimean War (1854-55) was 63.5 per cent., in our Civil War it was still 48.7 per cent., but this percentage has steadily fallen until, in 1890, it was only 6.9 per cent. A century ago the mortality from puerperal fever at the lying-in department of the Hotel Dieu in Paris amounted to 10%. Semmelweis, in 1847, first insisted upon compulsory antiseptic midwifery, and since that time the mortality has fallen in all well-regulated maternities to less than one per cent. Witness, also, the advances made in the construction of model hospitals, asylums, schools, prisons and industrial establishments in relation to light, heating, ventilation, etc.

At the close of the last century the mortality among the inmates of French prisons was 250 *pro mille*; in the German prisons,

in the forties, it was between 34 and 60 per 1,000, while in 1878 to 1882 it had fallen to 27 per 1,000.

In the matter of personal hygiene much has been done in the way of improved dietetics, clothing, exercise, and especially in the care and feeding of infants, but much remains to be done.

I will not weary you with a recital of what other countries have accomplished in the way of national and local health boards, enactment of health laws, the enforcement of sanitary police regulations, laws for the suppression of quackery and quack remedies, all of which have contributed greatly to the sum-total in the field of public sanitation.

While the people of the United States were not slow in adopting and originating sanitary measures of great value, our ideas of personal liberty, guaranteed to us by the Constitution, evidently prevented early legislation in matters of public health, except in matters of State quarantine, for fear that such legislation might affect the personal habits of the citizen and lessen his freedom of action. At all events, the first State Board of Health was established in Massachusetts only in 1869, since which time nearly all of the other States have followed her example. In 1872 the American Public Health Association was organized, and numbering, as it does, among its members some of the best minds in the profession, much good has been accomplished by this body and the so-called 'sanitary conventions' in molding public opinion and in framing and recommending health laws.

Measures for the control and restriction of contagious diseases have been adopted by most of the Health Boards, and a number of States enforce compulsory vaccination for school children, and have passed laws regulating the sale of poisons, and for the prevention of food and drug adulterations, and the extermination of bovine tubercu-

losis. In 1879 Congress created a National Board of Health, whose duty it was to make investigations into the causes and means of prevention of contagious and infectious diseases, to indicate measures of national importance and to be a center of information for all matters relating to public health. For want of appropriation this important body has ceased to exist, and since 1883 the duties relating to international and interstate quarantine have been discharged by the Surgeon-General of the Marine Hospital Service; his bureau, apart from the management of hospitals and stations for the care of sick and disabled seamen of the merchant marine, has also undertaken the collection and dissemination of mortality statistics and sanitary information, scientific investigation into the causes of disease, the physical examination of immigrants under the law excluding those affected with contagious disease—service in the office of consuls at foreign ports to assure the accuracy of bills of health—and other miscellaneous duties. Since Congress has failed to act upon the President's repeated recommendation and the petition of numerous medical societies for the creation of a National Health establishment, there is no good reason why the scope of duties and powers exercised by the Marine Hospital Service should not be enlarged.

An advisory board, composed of one representative from the various State Boards of Health, the chiefs of the medical department of the army and navy, and of the Bureau of Animal Industry, Census and Weather Bureau, and one of the legal officers of the government, could meet once or twice a year and decide upon a line of work for the promotion of public health.

One of the most pressing needs is an investigation into the pollution of water-supplies when such pollution affects or threatens to affect the sanitary condition of the people of more than one State, because the

individual States are powerless to protect themselves against the misdeeds of their neighbors. Mr. Barthold's bill for the appointment of a River Pollution Commission, two years ago, was defeated; yet that same Congress appropriated \$40,000 for the extermination of the Gipsy moth. England enjoyed the benefit of such a commission as early as 1855, and, in order to prevent, remedy and remove the danger of polluted water-supplies, adopted a comprehensive system for the disposal of sewage and of water filtration, the fruits of which have already been referred to.

We know that the Potomac River receives the drainage from every town and hamlet washed by its shores and tributaries, and what is true of the Potomac is equally true of the Ohio, Mississippi, Merrimac, Connecticut, Missouri, the Red River, the Columbia and Wabash Rivers, which are the sewers and, at the same time, the source of water supply for nearly all the cities located upon its banks, and these cities, as shown by the statistics collected by the Marine Hospital Service, show moreover a marked prevalence of typhoid fever, confirming what has elsewhere been proved, that this disease, as also cholera, dysentery and diarrhœal diseases, can be carried from one town or city to another by means of a water course.

Surgeon-General Wyman in a recent contribution estimates, from statistics received in his office, that every year there are no fewer than 45,000 deaths caused by typhoid fever alone throughout the United States, and, based upon an estimated mortality of 10%, it is within reason to assume a yearly prevalence of 450,000 cases of this disease. The average duration of a case of typhoid fever is not less than 30 days. If we calculate that an average of \$1.00 is expended per day for care, treatment and loss of work, and that the value of a human life is \$5,000 each, we have a total loss in

the United States of \$238,500,000 per annum from one of the so-called preventable diseases. Reduce the prevalence of this single disease one-half, which has been accomplished in England, and the oft-recurring question: "How is it our fathers got along without these so-called modern improvements?" will be satisfactorily answered from an economic point of view.

Another subject which deserves special attention is the question of pure foods and drugs. It would lead me entirely too far even to touch upon all the gross frauds and their serious consequences which are daily perpetrated, but permit me to refer to a very universal article of food, viz., milk. Analyses of milk sold in New York City showed an average dilution with 33% of water, the fraud amounting to \$10,000 per day. The State Inspector found 12% of water added and 20% of cream removed. The results in St. Louis, Chicago and this and every other city are similar, and indicate the desirability of stringent laws governing the milk traffic as a protection to the pocket of the consumer; but when we remember that Dr. Busey and the writer have collected and tabulated 138 epidemics of typhoid fever, 74 of scarlet fever and 28 epidemics of diphtheria, and that an analysis of the evidence showed that the poison of these diseases may reach the milk by soakage of the germs into the well water with which the utensils are washed, or by the intentional dilution with infected water; that the infection can be conveyed by animals wading in sewage-polluted water, or by the dairy employes acting as nurses, or suffering themselves from some mild infection while continuing their usual duties, or are convalescent from the disease; and that infection has taken place through the agency of scrubbing brushes, flies and other insects, exposure of the milk in or near to the sick rooms, or washing the patients with

the same cloth used in wiping the dairy utensils, we see at once that dairies should be under sanitary control to prevent the propagation of disease by infected milk. This should include inspection of the dairy stock by competent veterinarians, so that the milk of animals suffering from bovine tuberculosis, erysipelas, anthrax, pleuropneumonia, foot and mouth disease, septic and other fevers, specific enteritis, rabies, tetanus, garget and other inflammatory conditions of the teats and udder may be excluded from the supply. Milk may also be rendered unfit for use by reason of improper food and care of the animal, or while the animal is being treated with powerful remedial agents. It is interesting to note that of the 240 milk epidemics collected by us, 187 were reported by English, 31 by American and 9 by Scandinavian observers; 8 came from German, 3 from Australian, and 1 each from French and Swiss sources. And right here it is suggested that the infrequency of milk-typhoid in France and Germany is due to the fact that milk is rarely used in its raw state on the Continent of Europe, and the germs are destroyed by sterilization.

The first movement towards securing comprehensive legislation against the adulteration of foods and drugs in this country was made in 1879. This is all the more surprising because Dr. Mann in his *Medical Sketches of 1812* remarks that "the bread on the Niagara was made of damaged flour, such as was either not nutritious or absolutely deleterious." It was believed also that the flour contained in some instances an earthy substance, and that this adulterating substance was 'plaster of paris.' Again, during the Civil War, as early as in the winter of 1861-62, an extract of coffee furnished the troops in the vicinity of Alexandria produced nausea and vomiting in those who used it, and subsequently a government contractor, for having practiced

food adulterations, was sentenced to a protracted imprisonment.

Instances, therefore, were not wanting pointing to the necessity of such laws; nevertheless, it was not until 1881 that three States, New Jersey, New York and Michigan, passed laws to prevent the adulteration of food and drugs. The law in New York commenced in the summer of 1882. At the close of the year 286 samples of food and drugs had been submitted to the public analyst for examination, of which 194 had been reported upon. Of 119 samples of food, 50 were found adulterated; while of 75 samples of drugs, 32 were adulterated.

Since 1883 quite a number of States have enacted similar laws, but I regret to say that in spite of the absolute necessity for such a law in this city, as revealed by the report of the chemist of the Health Office, the bill introduced during the last session of Congress failed to become a law. The majority of States have enacted laws to regulate the sale of poisons, but a careful study shows that they should be amended and greater restriction placed on the sale of poisons generally. A recent investigation, by a committee of the Medical and Surgical Society, into the extent of the opium habit in the District of Columbia, reveals the fact that during the past 10 years 7 persons died from the opium habit, 36 persons died from accidental or negligent opium poisoning, and 125 cases of opium poisoning and 70 patients were treated for the opium habit in our public hospitals. This does not include persons treated for acute or chronic opium poisoning in private practice. Investigation into the causes of the opium habit led to the conclusion that one class of subjects have contracted the habit by the use of the milder preparations of opium, and some of the various proprietary or secret remedies commonly employed as domestic remedies, such as paregoric, Mc-

Munn's elixir, diarrhoea mixtures, pain-killers, etc. Another class have evidently acquired the habit by the constant use of prescriptions containing opium or its preparations for the relief of pain, the individuals being at first quite unconscious of the enslaving nature of the drug. Still another class of persons belong to the moral degenerates of fast men and women, who have acquired the habit by contact with opium habitués including opium smokers, and through solicitation, invitation and persuasion have fallen victims to the vice.

Since the opium habit is often established by the unauthorized and indiscriminate renewal of prescriptions containing opiates, the New York Legislature very wisely enacted, in 1886, a law that no pharmacists shall refill more than once prescriptions containing opium or morphine, or preparations of either, in which the dose of opium shall exceed $\frac{1}{4}$ grain, or morphine $\frac{1}{20}$ grain, except with the verbal or written order of a physician. A similar bill was introduced into Congress during the winter session, but failed to become a law. This city is also without a law for the suppression of the opium joints, in spite of the fact that a man died a few months ago from the effects of opium smoking in one of the joints, of which there are two; and a conservative estimate places the number of habitual opium smokers in the city between 150 and 200.

It is clearly the duty of the State to close opium dens and restrict the sale of poisons, and in regard to the sale of patent and proprietary medicines containing poisonous drugs the contents should be expressed on the label and the word poison added.

At the risk of taxing your patience, permit me to refer to the subject of patent and proprietary medicines.

By the term patent medicine, as properly employed in this country, England and Europe generally, it must be understood

that the composition is known and can be seen at the Patent Office. The proprietary medicine is a secret preparation protected by a trade mark in this country, and hence preferred by the owner, but both are vaguely termed by the public patent medicines.

The extent of the traffic will be apparent when I tell you that up to December 31, 1896, the United States Patent Office had issued patents on the following:

Disinfectants.....	235
Extracts.....	226
Hair dyes and tonics	43
Insecticides.....	145
Internal remedies	356
Plasters.....	48
Topical remedies.....	351
Veterinary remedies.....	75

TRADE MARKS.

Drugs and chemicals.....	614
Medical compounds.....	4979

The proprietary medicines are subject to the control of the State authorities, and if containing alcohol in sufficient quantity to be intoxicants are subject to Internal Revenue Laws, but so far as my knowledge extends little or nothing has been done in this country and in England to control the sale of secret remedies. Dr. G. Danford Thomas, Coroner of London and Middlesex, before the International Congress of Hygiene in 1891, very justly urged that all proprietary medicines should be under the Patent Laws, because the composition is at least disclosed; he would abolish licences to sell them and confine the sale to chemists and druggists only. In these matters we could certainly profit by the example of the Japanese, Italian, French and German laws. The Japanese government has established a public laboratory for the analysis of chemicals and patent medicines. The proprietors are bound to supply a sample with the names and proportions of the ingredients, directions for its use and an explanation of the supposed efficacy. During

the year 1889 there were no fewer than 11,904 applicants for licenses to prepare and sell 148,091 patent and secret medicines. Permission for the sale of 58,638 different kinds was granted; 8,592 were prohibited; 9,918 were ordered to be discountenanced, and 70,943 remained still to be reported on. The majority of those authorized to be sold were of no efficacy, and but few were really remedial agents. The sale of these was not prohibited, as they were not dangerous to the health of the people. No objection can be urged to this law from a sanitary point of view, except that it continues to protect the 'pseudo-scientist.'

In Italy (which country, by the way, has the best national board of health) the sale of secret remedies in January, 1891, became subject to the following regulations: The composition as to the quality and quantity of the active substances contained must be written on the labels and on the advertisements; no special therapeutic virtue or indication shall be attributed to them either on the label or advertisement; they shall be sold only by chemists under the vigilance of the sanitary authorities and with medical prescriptions.

In France the pharmacier is forbidden to sell secret remedies or even to keep them on his premises under heavy penalties.

In Germany the chemist may sell patent medicines when ordered by the prescription of the physician. He must not sell secret remedies. All patent medicines sold by the chemist must be prepared under special supervision and according to the rules of the pharmacopœa.

From the foregoing we may conclude that, while a good deal has been accomplished by public and private sanitation, much remains to be done before the average length of human life reaches three-score and ten.

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